SECTION III. THE ORE REGION OF THE HARZ MOUNTAINS AND THE SURROUNDING AREA

Introduction

This section deals with the Harz Mountains and their surrounding area, within a sector enclosed by the cities of Halle, Magdeburg, Hannover, and Goettingen, and also including the copper-bearing shale regions of Mansfeld and Sangerhausen.

The text is subdivided as follows:

I. Ore deposits of the Upper, Central and Southern Harz Mountains

II. Ore deposits of the Lower Harz Mountains

III. Copper-bearing shale of the western and southern foothills of the Harz Mountains

IV. Sedimentary iron ore deposits in the northern Harz Mountains foothills (supplement)

The general regularities in the distribution of the ore deposits are discussed for each of these chapters. They are particularly instructive in the following areas:

a. In the Upper, Central and Southern Harz Mountains, around the Brocken massif, horizontal and vertical metallogenetic zones can be recognized. However, they are not inclosed by the Brocken granite in the form of aureoles, but rather as different successive streaks, rhythmically repeated around several centers (Clausthal, St. Andreasberg, Lauterberg-Hasserode-Hohne). The arsenopyrite deposits (Hasserode-Hohne, St. Andreasberg) must be considered as near the magma and with a high thermal value; thus, their primary variations in depth increase with the depth. In the areas of Clausthal, St. Andreasberg, and Lautersberg, the vertical zoning shows a pitch toward the southwest, away from the Brocken mountain. The surface outcroppings of the vein formations correspond to this feature. In cases of complete development, e.g., there follow, starting from the bottom, on top of one another, layers with predominantly carbonatic veins, quartz or quartz-and-pyrite, zinc

blende, galena, and barite. However, the primary variations in depth are probably caused not only by the distance from ore-giving magma, but also by differences in the solubility of the metals and by the temporal coincidence of the formation of fissures and temperature/ conditions favorable to precipitation. The veins were created as distension disturbances simultaneously with the Upper Carbonaceous folding of the Paleozoic. The granite of the Brocken probably continues underground to the west and south. It certainly has its roots of uprising in the east, where the high-thermal deposits of Hasserode are located, and from there widens out to the granite of the Ilsenstein in the northwest.and the regular granular Brocken granite in the southwest. This shows some very interesting analogies to the situation prevailing in the Riesengebirge of the Sudeten range. In the area of St. Andreasberg, the higher deposits are probably at the top of the hidden granite tongue, particularly close to the magma. Thus, the relationships between the deposits and the internal structure of the plutonic rock of the Brocken are more of a criterion for the distribution than their distance from the origin of the ore by itself.

b. The zonal arrangement is even more marked in the Lower Harz Mountains. The Ramberg granite shows decidedly acid differentiation products, also in pneumatolytical phase, and extends further to the south underneath a wide aureole. From the center to the periphery, there follow in succession a copper-arsenic-pyrite-wolframite zone, a galena-zinc blende zone, a siderite zone, an antimony zone, and a recent fluorite-barite zone. The long Neudorf-Strassberg vein penetrates the first three of the above aureole-like zones and thus is part of various zones in its different sections. Furthermore, the Varistian tectonic structures have determined the path of the mineralizers to a large extent. The displacement of the center of the ore-giving magma and telescoping and rejuvenation processes may also be the cause of the many complications in the vertical telescoping and the lateral changes in the filling of the vein sections.

The regularities which can be recognised in the ore-formation of the copper slate basins are altogether different. Here, paleographic conditions predominate, viz. climatological and orographic conditions at the time of the erosion of primary ore deposits on the adjacent continent, form and depth conditions, water temperature, salt content, CO_2 pressure, living conditions of the microorganisms capable of precipitating metal, etc. in the sedimentation basins. The main copper deposits of the Zechstein sea are clearly limited to the deep channels and to the deeper parts of secondary bays, while the shallower regions are covered by a zinc and lead zone. This zoning also exists in a vertical direction. With change in facies, these zones were displaced depending on the depth conditions. The so-called cobalt ridges probably were subject to ore precipitations by water circulating within the Permian limestone, which may have been heated additionally by a magmatic ridge running at greater depth.

The sedimentary iron ore deposits in the Northern Harz foothills do not show any relation to the deposits of nonferrous metals.

Table of Contents

(Note: The page references on the table of contents of the original are incorrect!)

Illustrations